**Setup:** Corning® Lab Reactor with one module

**Model Reaction:** Wittig reaction

Adapted from: Analyst, 2001, 126, 7-10

\[
\begin{align*}
\text{O}_2\text{N} & \text{PPh}_3\text{Br} + \text{C}_6\text{H}_4\text{CHO} + \text{KOH} \xrightarrow{\Delta T} \\
\text{O}_2\text{N} \text{Ph-CH=CHPh}
\end{align*}
\]

**Analytics:**
Human eye (optional online UV/Vis Spectroscopy)

**Safety:**
Make sure you have read the MSDS of the chemicals and the safety notes in the Lab Reactor Manual.

**Feed Preparation:**
- Feed 1: 478 mg (1 mmol) 4-Nitrobenzyltriphenylphosphonium bromide (CAS 2767-70-6) are dissolved in 100 ml Ethanol. 127 mg (1.2 mmol) of benzaldehyde (CAS 100-52-7) are added to the solution.
- Feed 2: 112 mg (2 mmol) KOH are dissolved in 100 ml Ethanol (Dissolution takes some time ~1 h).

**Flow experiment:**
The solutions are pumped with similar flow rates (e.g. 1 ml/min per pump) through the module. The flow rates and temperature can be varied in order to optimize conversion.

Hint: When changing the temperature, wait until the measured temperature is stable before taking a sample.

Cleaning: Replace both feed solutions with Ethanol and pump @ 1 ml/min for at least 20 min

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**Tips & Tricks: How to calculate residence time and flow rates.**

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\begin{align*}
\text{Residence time} &= \frac{\text{Reactor volume} \times 60 \text{s/min}}{\text{Flow rate}_{\text{total}}} \\
\text{Flow rate}_{\text{total}} &= \frac{\text{Reactor volume} \times 60 \text{s/min}}{\text{Residence time}}
\end{align*}
\]

Flow rate \(_{\text{total}}\) = Flow rate Pump 1 (ml/min) + Flow rate Pump 2 (ml/min)

Reactor volume = 1 module = 2.7 ml

Residence time = time of the liquid from entrance to exit
**Results:**
Red color disappears as reaction proceeds through mixing cells. Depending on your flow rates and temperature you will obtain more or less HEART cells with a red color.

**Conclusion:**
Yields/Conversion are controlled via two parameters: temperature and time.

Time is controlled via the flow rates of the pump. Normally the target should be the highest yield with the shortest reaction time.